ON UNILATERAL EXTIRPATION OF THE LARYNX; WITH REPORT OF A CURED CASE.[1]

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IT seems that opportunities for the successful unilateral extirpation of the larynx are rare.

Since 1878, when Billroth first demonstrated the feasibility of this procedure, only nineteen cases have been reported in medical literature; twenty, if we include the case under consideration. During this period the total extirpation of the organ was performed more than ninety times.[2]

Considering the brevity of this period, and the unavoidably incomplete histories of many of the cases, it must be admitted that to form conclusive deductions would be impossible at present.

But a sketch of the salient features of the subject would not be premature, and will, in the main, consist of true outlines.

A study of the subjoined twenty cases gathered from Solis-Cohen[3] and Billroth[4] will lead to following conclusions:

1. The rate of mortality after the partial excision is 20%. whereas that observed after total extirpation is 33 to the hundred. This refers to the cases of death directly due to the operation.

2. Complete cure, that is freedom from recurrence of the removed cancer or sarcoma, *together with a perfect or nearly per-*

[1] Paper read before and patient presented to the Med. Chir. Soc'y of New York, Nov. 2, 1885.

[2] Solis-Cohen in *Ashhurst's Encyclopedia of Surgery*, Vol V, p. 757.

[3] *Loc. cit.*

[4] Fritz Salzer, Larynxoperationen in der Klinik Billroth, 1870-1884. *Archiv. für klin. Chirurgie.* Vol. XXXI, p. 862.

fect preservation of the voice and deglutition, is possible and has been achieved in a remarkable number of cases. Certainly, the tendency to recurrence is not larger than after total extirpation.

3. With a very few exceptions the external wound could be closed permanently, and the use of a tracheal canula was not needed for respiration, as was invariably the case after total extirpation.

4. The power of deglutition was, in the main, well preserved in all cases except one.

In this, the operation was done for intractable cicatricial stenosis of the pharynx and larynx.

The history of the case in question is as follows:

H. O., æt. 57, porter, of good family history, had been suffering since five months of a rebellious hoarseness and steadily increasing painful deglutition. The latter trouble was much aggravated by a very irritating cough. Marked loss of power and emaciation had followed since the appearance of a lump under the left ear.

Dr. I. W. Gleitsmann kindly presented the patient to me March 8, 1885, when the following points were noted: On a heavy frame were seen shrunken muscles and wasted adipose tissue, the skin was flabby and slightly jaundiced: on each cheek a hectic red patch was seen. The thoracic and abdominal organs were normal. In the left submaxillary triangle, immediately behind the angle of the jaw, a deep-seated, nearly immovable, hard, glandular swelling, of the size of a hen's egg, was observed. On endolaryngeal inspection the presence of a smooth pale tumor was ascertained. The new growth had the size and shape of an almond. It commenced in the left glosso-epiglottidian fold, extended through the substance of the left vocal cord into the ary-epiglottidian fold, and ended in the arytenoid cartilage with a knoblike protuberance.

In consideration of the glandular swelling and of the circumstance that the good-sized tumor had not yet ulcerated, it was deemed plausible to diagnose a sarcoma, and the patient was advised to submit to unilateral extirpation of the larynx. He was admitted to the German Hospital March 16, and two days later, chloroform being administered, the infiltrated glands were removed, and preliminary inferior tracheotomy was performed. The sterno-mastoid was found partly involved, likewise a portion of the internal jugular vein. A part of the former and a piece of about $1^1/_2$ inches in length of the vein were removed in

one piece with the glandular tumor. The upper ligature, securing the vein, was applied close to the base of the cranium. The ends of the severed sterno-mastoid muscle were reunited by a number of catgut sutures, and two drainage tubes having been placed in the angles of the wound, the cutaneous incision was also closed. Duraticn of the operations was two hours.

The healing of the wound progressed correctly under antiseptic dressing, but deep mental depression was observed to materially interfere with the general welfare of the patient. Though no fever appeared, he visibly failed on account of dejection and lack of appetite. It is impossible to say whether the moderate amount of iodoform employed in the dressing, or the disheartening effect of the loss of voice by tracheotomy, was at the bottom of this trouble. Enough to state that it was deemed advisable to cheer up the patient by placing him under home surroundings. His wife took excellent care of him, and he returned to the hospital April 27, much strengthened in body and mind.

On April 27, under chloroform, the left half of the larynx was removed. A tampon-canula, made by Geo. Tiemann & Co., after my directions, was inserted and suitably distended, so as to prevent the entrance of blood into the trachea. After this an incision, commencing at the upper notch of the thyroid cartilage, and extending to the lower margin of the cricoid cartilage, laid bare the larynx in the median line. To this was added another incision commencing in the upper angle of the first cut, and extending horizontally to the anterior margin of the left sterno-mastoid muscle. The crico-thyroid ligament was split to admit a strong pair of bone pliers for the division of the thyroid cartilage; but it was found impossible to perform this act, as the strongly inclined position of the cartilage did not permit an effective handling of the instrument. Therefore, access was gained through an incision in the thyro-hyoid ligament from above, and in this manner an exact division of the calcified cartilage was successfully effected. After this the epiglottis was cut through lengthwise, the left half of the crico-thyroid ligament was divided, and the superior thyroid artery was included in a double ligature and cut through. The most difficult part of the operation consisted of the dissection of the lateral portions of the larynx and pharynx, closely adherent to the carotid artery by cicatricial tissue, caused by the extirpation of the submaxillary glands. Shallow incisions, running parallel with the course of the carotid artery, were cautiously made one after another, and the difficult task seemed almost completed, when suddenly a powerful jet of arterial blood welled up from the bottom of the wound. The bleeding point was easily secured in a pair of artery for-

ceps, and then it was ascertained, that the trunk of the superior thyroid artery (doubly ligated further below prior to this) had been cut away on a level with its inosculation into the carotid. A catgut ligature was applied around the main trunk above, another below the artery forceps, and when the instrument was removed a round hole in the side of the carotid became visible. The remaining adhesions, corresponding to the lateral portion of the pharynx on the left side, could now be easily dissected out. The tampon-canula was removed, and it was found that no blood whatever had entered the trachea. A soft tube was inserted into the œsophagus, the wound was loosely packed with iodoformed gauze, and an ordinary tracheal canula was left in the lower angle of the tracheal wound. Finally, the horizontal incision was closed by a number of catgut sutures. The duration of the operation was one hour and three-quarters —the anæsthesia throughout undisturbed.

Microscopical examination of the new growth by Dr. L. Waldstein gave the diagnosis of alveolar sarcoma.

The subsequent course of the wound was very satisfactory and free from fever or suppuration, the patient's only complaint being a rather profuse secretion of saliva. Nutrition was carried on by the œsophageal tube, the patient consuming considerable quantities of milk, eggs and an emulsion composed of beef tea and crushed boiled beef; finally, a generous supply of good whisky.

From May 10 on, the œsophageal sound was introduced twice daily for purposes of nutrition. On May 13, the tracheal canula was abandoned. On the same day the innermost layers of the iodoformed gauze packing became detached and were replaced. The entire wound was found to be in a vigorous process of granulation and was considerably contracted.

May 15.—The patient swallowed a small quantity of coffee.

May 16.—The plugging of the wound was discontinued. The edges of the vertical incision near its upper angle were brought together with a couple of silver wire sutures, but soon commenced to cut through and were removed as useless on May 18. At the same date plastic closure of the entire vertical opening was practiced. On account of cicatricial retraction the cutaneous surface of the left edge of the wound began to be much inverted, wherefore it was dissected up to the distance of about an inch from the margin, brought into exact apposition with the other side and there secured by four stitches.

May 22.—The patient swallowed some bread.

May 24.—He had a severe chill with a temperature of 104° F., accompanied by splenic intumescence. (One dose of quinine prevented

the return of a similar attack). His body weight had increased $4^1/_2$ pounds.

May 27.—The sutures were removed and the wound was found firmly united.

May 31.—Patient was dismissed cured, good deglutition being noted.

June 12.—In my office a small, suspicious glandular swelling was removed from the supra-clavicular region.

The patient presents now, Nov. 2, a remarkable improvement in his general condition. Compared with his former haggard, emaciated aspect, he looks as if rejuvenated, has a florid complexion, has regained more than his original weight and muscular strength, and is able to attend daily to his somewhat laborious occupation. Deglutition of solid and semi-solid substances is excellent; drinking, however, must be done slowly and carefully, to prevent the entrance of fluids into the trachea. He is able to speak with a hoarse whisper, that can be readily heard and understood across a space of 10 to 15 feet. The left side of the neck presents a deep lateral depression; the cicatrices are throughout soft and normal.

Laryngoscopical examination reveals a smooth, rather extensive cicatrix occupying the left side of the pharynx and larynx. The right vocal chord normally performs its functions.

The question of recurrence being set aside for the present, it may be safely asserted, that the operation, as far as the patient's well-being and comfort are concerned, has so far certainly produced a marked change for the better. And considering the far gone state of secondary glandular contamination, and the freedom from recurrence thus far preserved in this case, it may be predicted, that in future cases, where the disease will be detected early, and decisive measures will be taken at once, the results of the radical treatment of malignant neoplasms of the larynx suitable for unilateral extirpation will become more and more encouraging.

SYNOPTICAL TABLE OF TWENTY CASES OF UNILATERAL EXTIRPATION OF LARYNX.

No.	*Operator.*	*Date, Age, Sex.*	*Operation Removed.*	*Result.*	*Diagnosis.*	*Remarks.*
1.	Billroth, Vienna	1878. July 7. 50. M.	Left half of larynx, part of right vocal chord.	Cured. *Died* Nov.. 1879, of recurrence.	Epithelioma of left half of larynx.	Good deglutition. Loud hoarse voice. No canula.
2.	Gerster, New York.	1880. March 5. 50. M.	Right half of hyoid bone, larynx, pharynx, right tonsil; epiglottis and adjacent parts of basis of tongue.	Cured. *Died* March 9, 1881, of pleurisy and cardiac failure. No relapse.	Adeno-sarcoma.	Rough whisper. Deglutition imperfect, œsophageal tube was used to the end. No canula.
3.	Reyher, St. Petersburg.	1880. March 9. 57. M.	Left half of larynx.	Cured. No relapse fourteen months afterward.	Cancer.	
4.	Caselli.	1880. Nov. 9. 7. M.	Right half of thyroid cartilage with large adherent tumor.	Died two days after the operation.	Enchondroma.	
5.	Hahn, Berlin.	1880. ? 67. ?	One half of larynx.	Cured. No recurrence 3 1-2 years after operation.	Cancer.	See No. 8.
6.	Billroth.	1881. Feb. 11. 65. M.	Right half of larynx and pharynx.	Favorable course in the beginning. March 15, secondary operation followed by sepsis. *Died* March 22.	Cancer.	

SYNOPTICAL TABLE OF TWENTY CASES OF UNILATERAL EXTIRPATION OF LARYNX. (*Continued.*)

No.	*Operator.*	*Date, Age, Sex.*	*Operation Removed:*	*Result.*	*Diagnosis.*	*Remarks.*
7.	Schede, Hamburg.	188 . Oct. 19. middle-aged M	Right half of larynx.	Cured. No recurrence; patient alive 18 mo. after operation.	Infiltrating cancer.	Voice normal. Deglutition perfect. No canula.
8.	Hahn.	1883. ? M. ?	One half of larynx.	Cured. No recurrence. Alive nine months after operation.	Cancer.	Cases 5 and 8 speak so well with phonating canula that they decline to have external wound closed. Deglutition good.
9.	Billroth.	1883. May 11. 33. M.	Right half of larynx.	Cured.	Cicatricial stenosis.	Canula on account of returning stenosis.
10.	Clinton Wagner New York.	1885. Feb. 22. 53. M.	Right half of larynx and of first tracheal ring.	Died of collapse twelve days after operation.	Relapsing epithelioma, originally papilloma.	Operation preceded by two laryngotomies.
11.	Billroth.	1883. Nov. 8. 60. M.	One-third of right half of thyroid cartilage and portion of epiglottis.	Died Dec. 18, 8883. Secondary hæmorrhages; aspiration of vomited matter. Pneumonia.	Cancer.	
12.	Winiwarter, Liege.	1883. Dec. 18. M.	Right half of larynx, with preservation of mucous membrane.	Cured. Alive ten months after operation.	Perichondritis, with serious stenosis.	Loud but hoarse voice. No Canula. Good deglutition.

13.	Kuester, Berlin.	1883. ? 50. M.	One half of larynx.	Cured.	Sarcoma of vocal cord.	Good phonation. No canula.
14.	Kuester.	?	One half of larynx.	Cured.	?	
15.	Kuester.	?	Same.	Cured.	?	
16.	Kuester.	?	Same.	Died.	?	
17.	Billroth.	1884. June 25. 60. M.	Right half of larynx and part of mucous membrane of left half.	Cured. No relapse four months afterward.	Cancer.	Hoarse whisper. Good deglutition. Canula on account of cicatricial stenosis.
18.	Billroth.	1884. July 15. 58. M.	Right half of larynx and pharynx, and cervical glands.	Cured. Alive with relapse Sept., 1884.	Cancer.	Defective phonation. Defective deglutition.
19.	Billroth.	1884. Sept. 6. 46. M.	Right half of larynx and pharynx, cervical glands.	Cured.	Cancer.	Deglutition and phonation excellent seven weeks after operation.
20.	Gerster.	1885. April 29. 57. M.	Left half of larynx, part of left side of pharynx, left half epiglottis and cervical glands.	Cured. Alive without recurrence Nov. 2, 1885.	Alveolar sarcoma.	Hoarse voice. Good deglutition. No canula.